

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 09/25/2009 has been entered.

Response to Amendment

2. Acknowledgement is made of the amendment to the claims, filed 09/25/2009. Claims 1 and 3-6 are pending.

Allowable Subject Matter

3. Claims 1 and 3-6 are allowed.
4. The following is an examiner's statement of reasons for allowance: The present claims are allowable over the closest prior art references of record: Ito et al. (WO 02/33709), Nomura et al. (WO 03/41091) and Li et al. (WO 05/01037).

With regard to the limitations set forth in the instant claims 1 and 6, Ito et al. discloses a polymer electrolyte membrane comprising a vinyl copolymer containing phosphoric acid group and sulfonic acid group. The polymer is not siloxane-based.

Nomora et al. discloses a proton conducting membrane comprising a cross-linked network of organic-inorganic hybrid structure prepared by hydrolyzing/condensing a bis(di- or tri-alkoxysilyl)alkane or an OH-terminated polydimethylsiloxane with a sulfonic acid-containing monomer having a cross-linkable group that includes a halide, hydroxysilane, or alkoxy silane. The polymer is not made from silane-containing (meth)acrylate monomers and it does not contain phosphoric acid group.

Li et al. discloses hybrid organic-inorganic polymer electrolyte membranes based on alkoxy silane-grafted thermoplastic polymers. The membranes are prepared by grafting a thermoplastic polymer with alkoxy silane-containing monomers such as methacryloxypropyltrimethoxysilane, followed by hydrolysis/condensation with alkoxy silanes such as tetraethoxysilane, and treatment with a proton-conducting species such as H₃PO₄. The membranes therefore contain Si-O-Si network. The grafted polymer is very different from the claimed polymer as it is not based on an acrylic backbone. Further, phosphoric acid is used as a dopant, not as a part of the polymer.

Although there may be reasons for one of ordinary skill in the art to combine Ito, Nomora, and Li to arrive at a polymer electrolyte membrane comprising a highly cross-linked organic-inorganic hybrid structure involving a vinyl polymer being cross-linked via Si-O-Si bonds, and involving phosphoric acid group, it would not have been obvious to a person having ordinary skill in the art at the time the invention was made to have combined the three references to arrive at the claimed membrane, let alone the claimed method.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vu Nguyen whose telephone number is (571)270-5454. The examiner can normally be reached on M-F 7:30-5:00 (Alternating Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Vu Nguyen

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Examiner
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/David Wu/
Supervisory Patent Examiner, Art Unit 1796